

The opinion in support of the decision being entered today  
is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* WEI-KUO LEE,  
MARIOS AVGOUSTI and  
SUH JOON HANN

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Appeal No. 2007-1237  
Application No. 10/813,367  
Technology Center 1700

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Decided: July 27, 2007

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Before BRADLEY R. GARRIS, CHARLES F. WARREN, and  
JEFFREY T. SMITH, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. §134 from the Examiner's final rejection of claims 1-8, which are all of the claims pending in this application.

We AFFIRM.

## BACKGROUND OF THE INVENTION

The Appellants' invention relates to a cable comprising one or more electrical conductors or communications media comprising: (a) polyethylene; polypropylene; or mixtures thereof; (b) carbon nanotubes; and (c) a conductive carbon black other than carbon nanotubes. An understanding of Appellants' invention can be derived from a reading of exemplary claim 1, which is reproduced from the Brief below:

1. A cable comprising one or more electrical conductors, communications media or a core, each electrical conductor, communications medium, or core being surrounded by a layer comprising:
  - (a) polyethylene; polypropylene; or mixtures thereof;
  - (b) at least about 3 parts by weight, based on the weight of component (a), carbon nanotubes;
  - (c) a conductive carbon black other than carbon nanotubes, the carbon black present in an amount at least about 10 parts by weight, based on the weight of component (a); and
  - (d) optionally, (i) a copolymer of acrylonitrile and butadiene wherein the acrylonitrile is present in an amount of about 30 to about 60 percent by weight based on the weight of the copolymer or (ii) a silicone rubber.

## PRIOR ART

The prior art references of record relied upon by the Examiner in rejecting the appealed claims are:

DELPHIN	US 4,717,505	Jan. 5, 1988
BURNS, JR.	US 4,857,232	Aug. 15, 1989
SMALLEY	US 6,183,714 B1	Feb. 6, 2001

The Examiner has entered the following grounds of rejection:

Claims 1, 4, 5, and 7 stand rejected under 35 U.S.C. § 103(a) as obvious over Delphin and Smalley; and,

Claims 2, 3, 6, and 8 stand rejected under 35 U.S.C. § 103(a) as obvious over Delphin, Smalley, and Burns, Jr. (Answer 4-5).

#### DISCUSSION

Claims 1, 4, 5, and 7 are rejected under 35 U.S.C. § 103(a) as unpatentable over Delphin (4,717,505) in view of Smalley (6,183,714).

Delphin discloses a composition comprising polyethylene (a), at least about 3 parts by weight, based on the weight of component (a), carbon fiber, and a conductive carbon black (c) other than the carbon fiber, the carbon black being present in an amount at least about 10 parts by weight, based on the weight of the component (a) (col. 3, ll. 29-34). Delphin differs from the claimed invention in that the composition does not comprise carbon nanotubes and Delphin does not disclose the composition is used to surround a conductor.

Smalley discloses a composition comprising carbon nanotubes. Smalley discloses that carbon nanotubes are useful as strengthening agents in composite materials and is useful in combining with other forms of carbon such as carbon black (col. 3, ll. 61-65).

The Examiner concluded that it would have been obvious to one skilled in the art to replace the carbon fiber of Delphin with carbon nanotubes to obtain the advantages of using carbon nanotubes as strengthening agents in the composite material. The Examiner also concluded that it would also have been obvious to use the composite of Delphin to surround a conductor since the composition of Delphin provides both electrical and mechanical properties.

Appellants have not contested the establishment of a *prima facie* case of obviousness by the Examiner. Rather Appellants contended that “[t]he key issue on appeal is whether the evidence of unexpected results provided by the Appellants rebuts the rejection based on obviousness over a combination of the prior art” (Br. 9).

Thus, the issue on appeal in this case is as follows: Is Appellants’ evidence of unexpected results sufficient to successfully rebut the Examiner’s established a *prima facie* case of obviousness? We answer this question in the negative.

Appellants may rely on evidence of unexpected results to rebut an established *prima facie* case of obviousness. *See In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). Rebuttal may take the form of “a comparison of test data showing that the claimed compositions possess unexpectedly improved properties ... that the prior art does not have, that the prior art is so deficient that there is no motivation to make what might otherwise appear to be obvious changes, or any other argument ... that is pertinent.” *In re Dillon*, 919 F.2d 688, 692-93, 16 USPQ2d 1897, 1901 (Fed.Cir.1990) (*en banc*) (citations omitted).

Regarding the unexpected results, Appellants state:

The Applicants believe that the present invention exhibits surprising results in view of the prior art. In particular, the prior art would not lead one skilled in the art to expect the synergistic effects on melt viscosity and volume resistance achieved by using a blend of carbon nanotubes and carbon black. Also, the Applicants believe that the current invention demonstrates an unexpected long term stability in volume resistivity [sic, resistivity].

Table 1 on page 18 [sic, 13] of the specification reports the viscosity for various compositions, and the viscosity of the Example I composition (all carbon black) is significantly higher at various shear

rates than the viscosity of the Example 4 composition (mixture of carbon black and carbon nanotubes). The lower viscosity of Example 4 is important to a more facile processing of the composition into a semiconductor shield layer. This lower viscosity is even more striking when compared against the composition of Example 2 which contains 20 weight percent carbon nanotubes and 0 weight percent carbon black. The viscosity of the composition of Example 2 is even greater across the various shear rates than that of the composition of Example 1.

In addition, at page 20 [sic, 15], Table 2 of the specification, the volume resistivities of the compositions of Examples 1-4 are reported. The Examiner will note that not only is the volume resistivity of the composition of Example 4 comparable to that of the composition of Example 1, but it is much more stable over various thermal cycles than the volume resistivity of the Example 1 composition.

(Br. 10-11).

While Appellants argue that the working examples of their specification demonstrate synergistic properties, Appellants have failed to point to sufficient evidence indicating that the results were considered to be unexpected to one of ordinary skill in the art. “It is well settled that unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification does not suffice.” *In re Soni*, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed.Cir.1995) (*quoting In re De Blauwe*, 736 F.2d 699, 705, 222 USPQ 191, 196 (Fed.Cir.1984)). The question here, we emphasize, is a question of evidence and the burden is on the Appellants to show unexpected results. *In re Johnson*, 747 F.2d 1456, 1460, 223 USPQ 1260, 1263 (Fed. Cir. 1984).

The data presented in the specification does not include a comparison of a composition comprising carbon particles and carbon fibers as suggested by Delphin. The results presented merely compare compositions that comprise carbon nanotubes and carbon particles (Example 4) to compositions that only comprise

carbon particles (Example 1). *In re Baxter Travenol Labs.*, 952 F.2d 388, 392, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991)(The “difference in results” must be established as being between the claimed subject matter and the closest prior art.).

The data relied upon by Appellants is also not commensurate in scope with the claimed invention. *See In re Greenfield*, 571 F.2d 1185, 1189, 197 USPQ 227, 230 (CCPA 1978) (“Establishing that one (or a *small* number of) species gives unexpected results is inadequate proof, for ‘it is the view of this court that objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support.’” (*quoting In re Tiffin*, 448 F.2d 791, 792, 171 USPQ 294, 294 (CCPA 1971)). Appellants test only a few compositions, as exhibited in the tables of the specification. However, the claims on appeal are much broader. The claimed subject matter encompassed all combinations of carbon particles and carbon nanotubes. According to Appellants, the results achieved for the composition of Example 8 is unexpected; however, the results achieved for Example 7 (a composition comprising the combination of carbon nanotubes and carbon particles) are not superior in all categories (See Specification 16).<sup>1</sup> Appellants have not demonstrated that the alleged results can be reasonably extrapolated for all cables comprising (a) polyethylene, polypropylene or mixtures thereof; (b) carbon nanotubes; and (c) a conductive carbon black.

Claims 2, 3, 6 and 8 are rejected under 35 U.S.C. § 103(a) as unpatentable over Delphin et al. in view of Smalley et al. as applied to claim 1 above, and further in view of Bums, Jr. Appellants have also not presented

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<sup>1</sup> We also recognize that the amount of polymer components and processing aid vary based upon the individual examples (See Table 1). Thus, it cannot be said that the results obtained are due solely to the presence of a combination of carbon particles and carbon nanotubes.

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arguments regarding the Examiner's motivation for combining the teachings of the cited references. Consequently, it appears as if Appellants are relying on the unexpected results presented in rebuttal to the previous rejection. This evidence is not persuasive for the reasons set forth above.

#### CONCLUSION

To summarize, the prior art rejections of claims 1-8 are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv)(2006).

AFFIRMED

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